

## ARTIFACT SHEET

Enter artifact number below. Artifact number is application number + artifact type code (see list below) + sequential letter (A, B, C ...). The first artifact folder for an artifact type receives the letter A, the second B, etc..

Examples: 59123456PA, 59123456PB, 59123456ZA, 59123456ZB

09779710

Indicate quantity of a single type of artifact received but not scanned. Create individual artifact folder/box and artifact number for each Artifact Type.

☐

CD(s) containing:

computer program listing

Doc Code: Computer

pages of specification

and/or sequence listing

and/or table

Doc Code: Artifact

content unspecified or combined

Doc Code: Artifact

☐

Artifact Type Code: P

☐

Artifact Type Code: S

☐

Artifact Type Code: U

☐

Stapled Set(s) Color Documents or B/W Photographs

Doc Code: Artifact    Artifact Type Code: C

☐

Microfilm(s)

Doc Code: Artifact    Artifact Type Code: F

☐

Video tape(s)

Doc Code: Artifact    Artifact Type Code: V

☐

Model(s)

Doc Code: Artifact    Artifact Type Code: M

☒

Bound Document(s)

Doc Code: Artifact    Artifact Type Code: B

☐

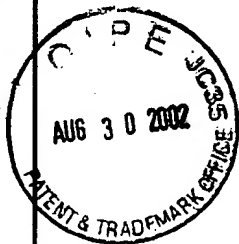
Confidential Information Disclosure Statement or Other Documents marked Proprietary, Trade Secrets, Subject to Protective Order, Material Submitted under MPEP 724.02, etc.

Doc Code: Artifact    Artifact Type Code X

☐

Other, description: \_\_\_\_\_

Doc Code: Artifact    Artifact Type Code: Z



1194-02654

US2

No. 5868114

# The United States of America



## The Commissioner of Patents and Trademarks

*Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.*

*Therefore, this*

## United States Patent

*Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term set forth below, subject to the payment of maintenance fees as provided by law.*

*If this application was filed prior to June 8, 1995, the term of this patent is the longer of seventeen years from the date of grant of this patent or twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.*

*If this application was filed on or after June 8, 1995, the term of this patent is twenty years from the U.S. filing date, subject to any statutory extension. If the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121 or 365(c), the term of the patent is twenty years from the date on which the earliest application was filed, subject to any statutory extension.*

*2. Todd Tschumi*

Acting Commissioner of Patents and Trademarks

*1000... M. Pearson*



US005868114A

**United States Patent** [19]**Kamimura et al.**[11] **Patent Number:** **5,868,114**[45] **Date of Patent:** **Feb. 9, 1999**[54] **AIR FLOW RATE CONTROL APPARATUS**

[75] **Inventors:** **Yasuhiro Kamimura**, Hitachinaka;  
**Yasushi Sasaki**, Ibaraki-ken; **Sadayuki Aoki**, Takahagi; **Kazuo Nagayama**, Hitachinaka, all of Japan

[73] **Assignees:** **Hitachi, Ltd.**; **Hitachi Car Engineering Co., Ltd.**, both of Japan

[21] **Appl. No.:** **969,708**[22] **Filed:** **Nov. 24, 1997**

5,452,697 9/1995 Sasaki et al. .... 123/399  
 5,490,487 2/1996 Kato et al. .... 123/399  
 5,517,966 5/1996 Kanazawa et al. .... 123/396

**FOREIGN PATENT DOCUMENTS**

0 315 794 A3 5/1989 European Pat. Off. .  
 0 317 813 A3 5/1989 European Pat. Off. .  
 0 596 392 A1 5/1994 European Pat. Off. .  
 34 05 935 A1 5/1985 Germany .  
 61-8441 1/1986 Japan .  
 3-50338 3/1991 Japan .  
 62-35334 8/1994 Japan .  
 WO 91/02890 3/1991 WIPO .

**Related U.S. Application Data**

[63] Continuation of Ser. No. 583,794, Jan. 16, 1996, abandoned.

[30] **Foreign Application Priority Data**

Jan. 17, 1995 [JP] Japan ..... 7-004673  
 Jan. 19, 1995 [JP] Japan ..... 7-006189

[51] **Int. Cl.<sup>6</sup>** ..... **F02D 11/10; F16K 31/04**[52] **U.S. Cl.** ..... **123/399; 251/129.11; 73/117.3; 73/118.2**[58] **Field of Search** ..... **123/396, 361, 123/399, 403; 251/129.11; 73/116, 117.3, 118.1, 118.2**[56] **References Cited****U.S. PATENT DOCUMENTS**

4,840,349 6/1989 Peter et al. .... 251/129.11  
 5,036,816 8/1991 Mann ..... 123/399  
 5,074,266 12/1991 Kuhn et al. .... 123/399  
 5,094,212 3/1992 Kawaguchi et al. .... 123/470  
 5,141,070 8/1992 Hickmann et al. .... 180/197  
 5,297,521 3/1994 Sasaki et al. .... 123/396  
 5,431,141 7/1995 Kanazawa et al. .... 123/399

*Primary Examiner*—Willis R. Wolfe*Attorney, Agent, or Firm*—Everson, McKeown, Edwards & Lenahan, P.L.L.C.[57] **ABSTRACT**

A throttle control apparatus for an engine on a vehicle is provided, in which the number of component parts in the position detection means and the driven means is reduced to improve the accuracy in its position control and at the same time an integrated wiring is achieved and connectors are aggregated. The position detection means for detecting the position of a control valve, the driven means for controlling the position of the control valve, the means for processing control signals, an output from the position control means for controlling the position of the control valve are disposed within a sealed space defined by a body supporting a control valve shaft, and a cover. Based on the fact that the number of component parts of the position detection means may be reduced, the mechanical hysteresis and electrical hysteresis may also be reduced to improve the accuracy in controlling the control valve position, and it is possible to aggregate the connectors.

**20 Claims, 6 Drawing Sheets**